

## **Visioning Plenary Address (Thursday, June 25, 2009)**

### **Living with the Changing Environment: Diversified Cropping Systems in Coastal Area in the Mekong Delta, Vietnam**

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#### **Abstract**

In the Mekong delta of Vietnam, intensive mono-shrimp (*Penaeus monodon*) and paddy rice cropping at the coastal areas are being challenged by global climate change including disease accumulation, salinity water intrusion, and unexpected storms and are causes for social differentiation. Attempt to diversify cropping systems to adopt to the changes were implemented from 2004 to 2007 within CPWF-10 project on a pilot at Bac Lieu province in the Mekong Delta of Vietnam.

Soil types, water demand and current land uses of the pilot were identified into different Land Use Zone (LUZ) units. On each LUZ, one or two study sites were chosen. A study site consisted of one demonstration farm and five nearby control farms. Demonstration farms applied one of the selected techniques and the nearby control farms were managed under current farmers' experiences. Local farmers participated in cropping systems analysis, needs assessment, income improvement and environmentally friendly management methods. The selected techniques were the well-tested new and renovated techniques such as saline tolerant rice varieties, row seeder for rice sowing, applying nitrogen fertilizer for rice crops based on Leaf Colour Chart, plastic sheet cover on upland crop, new fish species and stock density, shrimp stock density and release stock times. Farmers selected the techniques and applied on their farms under guidance of extension workers and researchers.

Eight demonstration farms and forty control farms were implemented. They are located on seven Land Use Zones which varies from fresh water to saline water environment. There were four major types of cropping systems such as Rice/Uplandcrop\_Rice; Rice\_Rice+Fish; Shrimp\_Rice+Fish; and Shrimp+Crab\_Fish. The selected cropping

systems for fresh water environment were Rice/Uplandcrop\_Rice and Rice\_Rice+Fish and the selected techniques for them were new rice varieties OM4495, OM3242, OM2517 and VND95-20; row seeder; apply nitrogen fertilizer based on Leaf Colour Chart; Tilapia (*Oreochromis niloticus*) GIFT+Anabas (*Anabas testudineus*)+Silver carp (*Cyprinus carpio*) species at ratio of 0.3+0.2+0.1 individual per square meter (in./m<sup>2</sup>). This technique when applied increased profit from 30 to 172 US Dollars per hectare per year (USD/ha/year) higher than the controls. The cropping systems for fresh-saline water interface was Shrimp\_Rice+Fish with the selected techniques were ST3 & ST5 rice varieties; row seeder; apply nitrogen fertilizer based on leaf color chart; Tilapia GIFT+Anabas+Silver carp at ratio 0.2+0.07+0.05 in./m<sup>2</sup> and shrimp (*Penaeus monodon*) density at 2.5 post larvae per square meter (PL/m<sup>2</sup>) and two stock times. This approach provided profits from -274 to 804 USD/ha/year compared to the controls. The cropping systems for saline water environment was Shrimp+Crab\_Fish and the selected techniques were elongated goby fish (*Pseudapocryptes elongatus*) at density 1 in./m<sup>2</sup>; Mud Crab (*Scylla olivacea*) at 0.05 in./m<sup>2</sup>; shrimp density at 4 PL/m<sup>2</sup>, and two stock times resulted in profits from -91 to 821 USD/ha/year compared to the controls.

At the end of 2007, there were approximately 8,700 farmers who had applied one of these selected techniques on 11,550 hectares in the selected pilot. And the lessons learned were: a) in a changing salinity water source, diversification is better than mono-shrimp farm due to higher profit per hectare and less accumulated risk; b) “key-stone crop” should be determined in each cropping system for proper water and farm management; c) farmers’ participation in whole processes of project is the key for successful application of new technology application; and d) zoning land uses is needed and its unit should be refined for convenience in different scenarios such as applying new techniques, water management and fishery resource reservation.